Scientific Excellence • Resource Protection & Conservation • Benefits for Canadians
Excellence scientifique • Protection et conservation des ressources • Bénéfices aux Canadiens

Recreational Mail Surveys, 1988 - Tidal Sportfishing Diary Program and Visitors Sportfishing Survey

L. Bijsterveld

Fisheries Branch
Department of Fisheries and Oceans
555 West Hastings Street
Vancouver, British Columbia V6B 5G3

November, 1989

Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 2042

Fisheries and Oceans Pêches et Océans
Canada

Canadian Manuscript Report of Fisheries and Aquatic Sciences

Manuscript reports contain scientific and technical information that contributes to existing knowledge but which deals with national or regional problems. Distribution is restricted to institutions or individuals located in particular regions of Canada. However, no restriction is placed on subject matter, and the series reflects the broad interests and policies of the Department of Fisheries and Oceans, namely, fisheries and aquatic sciences.

Manuscript reports may be cited as full publications. The correct citation appears above the abstract of each report. Each report is abstracted in *Aquatic Sciences and Fisheries Abstracts* and indexed in the Department's annual index to scientific and technical publications.

Numbers 1–900 in this series were issued as Manuscript Reports (Biological Series) of the Biological Board of Canada, and subsequent to 1937 when the name of the Board was changed by Act of Parliament, as Manuscript Reports (Biological Series) of the Fisheries Research Board of Canada. Numbers 901–1425 were issued as Manuscript Reports of the Fisheries Research Board of Canada. Numbers 1426–1550 were issued as Department of Fisheries and the Environment, Fisheries and Marine Service Manuscript Reports. The current series name was changed with report number 1551.

Manuscript reports are produced regionally but are numbered nationally. Requests for individual reports will be filled by the issuing establishment listed on the front cover and title page. Out-of-stock reports will be supplied for a fee by commercial agents.

Rapport manuscrit canadien des sciences halieutiques et aquatiques

Les rapports manuscrits contiennent des renseignements scientifiques et techniques qui constituent une contribution aux connaissances actuelles, mais qui traitent de problèmes nationaux ou régionaux. La distribution en est limitée aux organismes et aux personnes de régions particulières du Canada. Il n'y a aucune restriction quant au sujet; de fait, la série reflète la vaste gamme des intérêts et des politiques du ministère des Pêches et des Océans, c'est-à-dire les sciences halieutiques et aquatiques.

Les rapports manuscrits peuvent être cités comme des publications complètes. Le titre exact paraît au-dessus du résumé de chaque rapport. Les rapports manuscrits sont résumés dans la revue *Résumés des sciences aquatiques et halieutiques*, et ils sont classés dans l'index annuel des publications scientifiques et techniques du Ministère.

Les numéros 1 à 900 de cette série ont été publiés à titre de manuscrits (série biologique) de l'Office de biologie du Canada, et après le changement de la désignation de cet organisme par décret du Parlement, en 1937, ont été classés comme manuscrits (série biologique) de l'Office des recherches sur les pêcheries du Canada. Les numéros 901 à 1425 ont été publiés à titre de rapports manuscrits de l'Office des recherches sur les pêcheries du Canada. Les numéros 1426 à 1550 sont parus à titre de rapports manuscrits du Service des pêches et de la mer, ministère des Pêches et de l'Environnement. Le nom actuel de la série a été établi lors de la parution du numéro 1551.

Les rapports manuscrits sont produits à l'échelon régional, mais numérotés à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement auteur dont le nom figure sur la couverture et la page du titre. Les rapports épuisés seront fournis contre rétribution par des agents commerciaux.

Canadian Manuscript Report of
Fisheries and Aquatic Sciences 2042

November 1989

Recreational Mail Surveys, 1988 - Tidal Sportfishing Diary Program and Visitors Sportfishing Survey

by

L. Bijsterveld

Fisheries Branch
Department of Fisheries and Oceans
555 West Hastings Street
Vancouver, British Columbia
V6B 5G3

90-05396/

RECREATIONAL MAIL SURVEYS, 1988 - TIDAL SPORTFISHING DIARY PROGRAM AND VISITORS SPORTFISHING SURVEY

PREFACE

The Tidal Sportfishing Diary Program was initiated in 1979 to obtain estimates of the sport catch by B.C. residents fishing in B.C. tidal waters. The Visitors Sportfishing Survey was first conducted in 1982 to obtain estimates of sport catch and expenditures by visitors fishing in B.C. tidal waters. Previous reports cover survey development and annual results. This report serves as a continuation of this series and deals with the 1988/89 results. Catch estimates are presented in these reports as survey results and are not necessarily the accepted numbers for all species and areas.

©Minister of Supply and Services Canada 1989. Cat No. FS97-4/2042 ISSN0706-6473.

Correct citation for this publication:

Bijsterveld, L. 1989. Recreational mail surveys, 1988 - Tidal Sportfishing Diary Program and Visitors Sportfishing Survey. Can. MS. Rep. Fish. Aquat. Sci. 2042: vi + 31 p.

TABLE OF CONTENTS

PREFACE ii

LIST OF FIGURES vi

LIST OF TABLES vi

LIST OF APPENDICES v

ABSTRACT vi

INTRODUCTION 1

METHODOLOGY 2

- Tidal Sportfishing Diary Program 2
- Visitors Sportfishing Survey 2

RESULTS 4

- Returns 4
- Resident Sportfishing Population 4
- Population of Visiting Anglers 8
- Catch 14
- Effort 19
- Catch and Effort by Juvenile Anglers 18

DISCUSSION 21

- Nonresponse Bias 21
- Recall Bias 21
- Inaccurate Reporting 22

REFERENCES 23

LIST OF FIGURES

1. SEX COMPOSITION OF B.C. ADULTS, ANGLERS AND VISITING ANGLERS - 1988/89 10

2. AGE COMPOSITION OF B.C. ADULTS, ANGLERS AND VISITING ANGLERS - 1988/89 11

3. DISTRIBUTION OF B.C. RESIDENTS AND LICENCED ANGLERS BY REGION - 1988/89 12

4. COMPOSITION OF VISITING ANGLER POPULATION - 1988/89 13

LIST OF TABLES

1. DIARY RETURNS - 1988/89 5

2. ANNUAL DIARY RETURNS 1985 - 1988 6

3. ESTIMATED POPULATION OF B.C. RESIDENT ANGLERS 7

4. ESTIMATED POPULATION OF VISITING ANGLERS 9

5. 1988/89 CATCH AND EFFORT BY REGION FOR B.C. RESIDENT ANGLERS 15

6. 1988/89 CATCH AND EFFORT BY REGION FOR VISITING ANGLERS 16

7. 1988/89 B.C. TIDAL WATER SPORT CATCH AND EFFORT (000'S) 17

8. B.C. TIDAL WATER SALMON SPORT CATCH AND EFFORT (000'S) 1985 - 1988 19

9. 1988/89 SPORT CATCH AND EFFORT BY ADULT AND JUVENILE ANGLERS 20

LIST OF APPENDICES

A. SPECIES LIST - COMMON AND SCIENTIFIC NAMES OF FISH RECORDED 25

B. STATISTICAL AREA MAP 26

C. TIDAL SPORTFISHING DIARY PROGRAM - PANEL PRESENTATION 27

D. FORM SAMPLES 28

RECREATIONAL MAIL SURVEYS, 1988 - TIDAL SPORTFISHING DIARY PROGRAM AND VISITORS SPORTFISHING SURVEY

ABSTRACT

Bijsterveld, L. 1989. Recreational mail surveys, 1988 - Tidal Sportfishing Diary Program and Visitors Sportfishing Survey. Can. MS. Rep. Fish. Aquat. Sci. 2042: vi + 31 p.

Mail surveys collected 1988/89 licence year catch and effort data on recreational fishing in B.C. tidal waters. During 1,715,000 angler days, adult anglers caught and kept 1,835,000 salmon including 279,000 chinook and 1,367,000 coho. Problems related to mail surveys are reviewed.

Keywords: sportfishing, tidal waters, logbook, mail survey, catch statistics

RESUME

Bijsterveld, L. 1989. Recreational mail surveys, 1988 - Tidal Sportfishing Diary Program and Visitors Sportfishing Survey. Can. MS. Rep. Fish. Aquat. Sci. 2042: vi + 31 p.

Lors d'enquêtes par correspondance, on a recueilli des données sur les efforts et les prises pour la saison de pêche récréative 1988-1989 dans les eaux de marée en C.-B. Pendant 1,715,000 jours-pêcheurs, les pêcheurs adultes à la ligne ont capturé et gardé 1,835,000 saumons dont 279,000 saumons chinook et 1,367,000 saumons coho. Les problèmes reliés aux enquêtes par correspondance sont l'étude.

Mots clés: pêche sportive, eaux de marée, journal de bord, enquête par correspondance, statistiques sur les prises.

RECREATIONAL MAIL SURVEYS, 1988 - TIDAL SPORTFISHING DIARY PROGRAM AND VISITORS SPORTFISHING SURVEY

INTRODUCTION

The Tidal Sportfishing Diary Program is a mail survey of resident B.C. tidal water anglers. The Diary Program was introduced in 1979 as a method of estimating recreational catch and effort. It was necessary to survey large numbers of B.C. adults in order to contact anglers in the absence of a licencing program. The B.C. Tidal Waters Sport Fishing Licence, introduced during 1981, identified anglers and provided a sample base for the program beginning in 1982. The licences also provide a sample base for anglers visiting B.C. The Visitors Sportfishing Survey was first conducted in 1982 to obtain estimates of sport catch and expenditures by anglers visiting B.C. during the previous year. The 1981 and 1982 licence years corresponded to calendar years (January 1 to December 31). The 1983 licence year was a transition from a calendar year to a fiscal year (April 1 to March 31) and extended from January 1, 1983 to March 31, 1984. The 1983 Diary program and Visitors Survey covered the entire 15 month period although only the 1983 calendar year statistics were published. The 1988/89 population and catch and effort statistics correspond to the 1988/89 licence year (April 1, 1988 - March 31, 1989).

METHODOLOGY

A systematic sample of 37,000 1987/88 B.C. Tidal Waters Sport Fishing Licences was drawn. The licence information was keyed directly from the licence stubs into a computer to produce an address list. The B.C. addresses were used for the Diary Program while the remainder were used for the Visitors Sportfishing Survey.

Tidal Sportfishing Diary Program

In 1988/89, the Diary Program was conducted as follows: semi-monthly, a new sample or panel of 1,400 licence holders was mailed a diary form covering a full "month". Half of the panels were responsible for recording fishing activity for a calendar month, the other half for an interval from the middle of one month to the middle of the next. Data for the first half of the "month" was filled in from memory; data for the second half was filled in as anglers fished. Diarists were provided with addressed postage paid envelopes for returning the survey forms. Drawings of the 5 salmon species and lingcod, rockfish and halibut were included to aid identification. Reminders were sent to all panel members at the end of the "month".

The data from returned diaries was entered into a computer. A program checked the data during entry to prevent duplicate entries and to ensure that the areas, months, types of fishing and daily catches were valid. Invalid information was not used for estimation of catch and effort. Diaries received more that one month after the last date of the diary "month" were considered to be late and were not used.

Visitors Sportfishing Survey

Three thousand questionnaires were sent to visiting North American anglers (excluding B.C.) at the end of the licence year. Reminders were sent to questionnaire nonrespondents four weeks after the initial sendout. Questionnaire recipients were asked about their fishing activity in B.C. during the 1988/89 licence year.

The data from returned surveys was entered into a computer. A program checked the data during entry to prevent duplicate entries and to ensure that the areas, months, and daily catches were valid. Invalid information was not used for estimation of catch and effort. Surveys received more that one month after the reminder sendout were considered to be late and were not used.

RESULTS

Returns

The number of diary returns for each panel of the 1988/89 Diary Program is provided in Table 1. The percentage of anglers returning diaries and fishing during each diary period varies throughout the year, as shown in Table 1. During the entire year, 53% of the anglers contacted returned diaries. Thirteen percent of those returning diaries actually fished. Some anglers returned letters containing objections to the new chinook conservation tags in lieu of their diaries. It was feared that opposition to the tags would affect the response to the diary program. This does not seem to be the case as the response rate is similar to that obtained in other years (Table 2).

Three thousand questionnaires were sent out for the 1988/89 Visitors Survey. The return rate for the Visitors Survey was 72%.

Resident Sportfishing Population

The estimated number of B.C. resident adult anglers in 1988/89 is provided in Table 3. The population is estimated using the proportion of B.C. anglers in the licence sample and the total licence sales. The population consists of adult B.C. resident tidal water anglers, aged 16 and over. Characteristics of the population of licence holders can be estimated from the sample. Males account for 80% of the population of licence holders while females account for 20% (Figure 1). The population of B.C. adults, by comparison, is composed of almost equal numbers of males and females (Statistics Canada 1988).

The age composition of the B.C. adult population is presented in Figure 2. The proportion of individuals between 26 and 54 years of age is higher among licenced anglers than among B.C. adults in general. More young adults and people 55 years of age and over are present in the total population of adults (Statistics Canada 1988).

TABLE 1

DIARY RETURNS - 1988/89

Panel Period	Undeliverable	Total Possible Response	Number of Respondents	Adjusted Response (%)	% That Fished
1988					
Apr 01 - Apr 30	114	1,286	538	42	5
Apr 16 - May 15	115	1,285	775	60	7
May 01 - May 31	138	1,262	737	58	14
May 16 - Jun 15	104	1,296	731	56	17
Jun 01 - Jun 30	148	1,252	561	45	22
Jun 16 - Jul 15	147	1,253	673	54	23
Jul 01 - Jul 31	164	1,236	714	58	25
Jul 16 - Aug 15	164	1,236	491	40	32
Aug 01 - Aug 31	166	1,234	443	36	26
Aug 16 - Sep 15	161	1,239	635	51	29
Sep 01 - Sep 30	169	1,231	623	51	31
Sep 15 - Oct 16	164	1,236	651	53	22
Oct 01 - Oct 31	195	1,205	654	54	16
Oct 15 - Nov 16	171	1,229	644	52	8
Nov 01 - Nov 30	194	1,206	652	54	7
Nov 15 - Dec 16	175	1,225	684	56	4
Dec 01 - Dec 31	203	1,197	572	48	2
Dec 15 - Jan 16/89	219	1,181	676	57	3
1989					
Jan 01 - Jan 31	215	1,185	692	58	4
Jan 15 - Feb 16	215	1,185	643	54	3
Feb 01 - Feb 28	231	1,169	637	54	3
Feb 15 - Mar 16	230	1,170	664	57	2
Mar 01 - Mar 31	243	1,157	689	60	2
Mar 15 - Apr 16	235	1,165	619	53	6
TOTAL	4,280	29,320	15,398	53	13

TABLE 2

ANNUAL DIARY RETURNS 1985 - 1988

Diary Year	Undeliverable	Total Possible Response	Number of Respondents	Adjusted Response (%)	% That Fished
1985/86	1,149	7,601	4,361	57	15
1986/87	1,881	14,659	7,935	54	16
1987/88	4,340	24,603	14,050	57	14
1988/89	4,280	29,320	15,398	53	13

TABLE 3

ESTIMATED POPULATION OF B.C. RESIDENT ANGLERS

Year	Number of Anglers
1981	203,000
1982	223,000
1983/84	224,000
1984/85	225,000
1985/86	239,000
1986/87	242,000
1987/88	240,000
1988/89	237,000

The distribution of B.C. licenced anglers by area of residence is presented in Figure 3. Over 75% of licenced anglers are from Vancouver Island and the Greater Vancouver area. Eight percent of B.C. adults purchased a Tidal Waters Sport Fishing Licence in 1988. As expected, this percentage was higher in coastal areas as shown in Figure 3.

Population of Visiting Anglers

The estimated number of anglers visiting B.C. in 1988/89 is presented in Table 4. The sex composition of the population of visiting anglers is similar to the composition of B.C. resident anglers. Males account for 78% of the visiting population and females account for 22%.

The age composition of the population of visiting anglers is presented in Figure 2. The proportion of individuals over the age of age 45 is higher among visiting anglers than among B.C. resident anglers.

Americans accounted for 65% of the visiting anglers while Canadians accounted for 31%. The remaining 4% of the visiting anglers originated from outside North America. The proportions of visiting anglers by country of origin are presented in Figures 4 and 5.

TABLE 4

ESTIMATED POPULATION OF VISITING ANGLERS

	Country of Origin			
Year	Canada	U.S.A.	Other	Total
1981	32,300	43,100	3,600	79,000
1982	28,700	40,900	1,500	71,100
1983/84	30,300	42,600	2,000	74,900
1984/85	25,700	51,600	300	74,900
1985/86	27,200	63,600	2,600	77,600
1986/87	44,800	61,300	3,900	110,000
1987/88	33,200	71,100	4,200	108,500
1988/89	34,000	70,100	5,000	109,100

FIGURE 1

SEX COMPOSITION OF B.C. ADULTS, ANGLERS AND VISITING ANGLERS - 1988/89

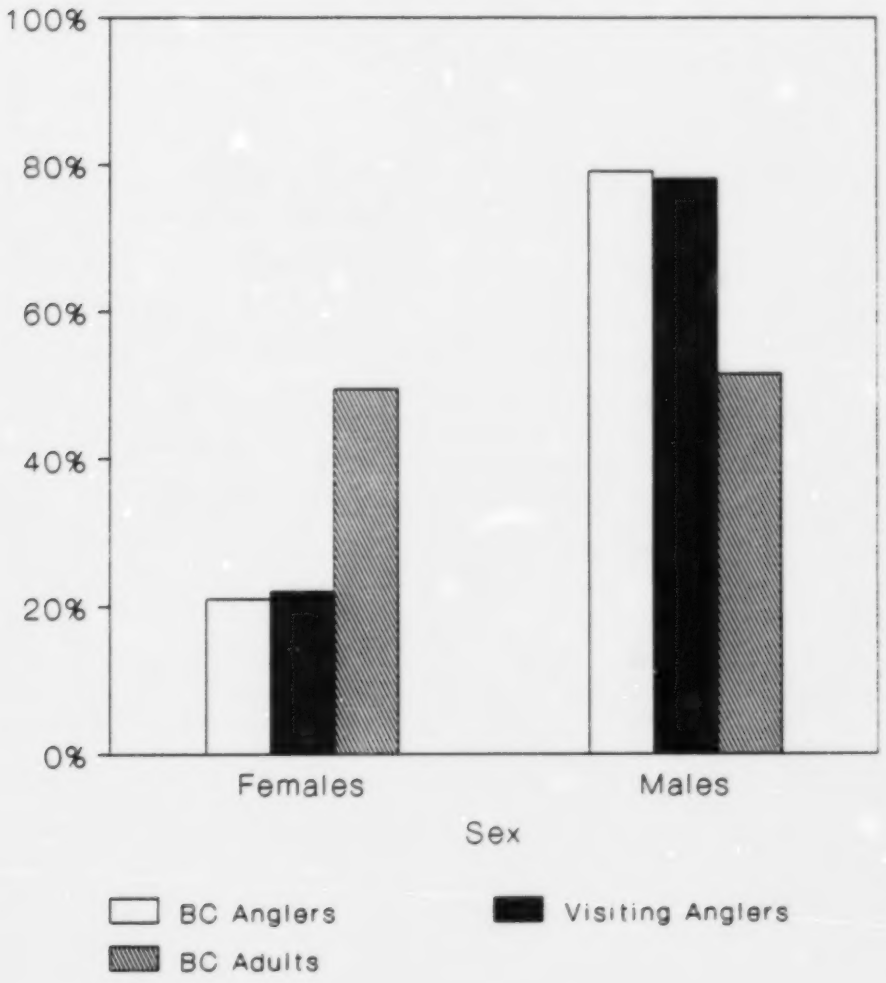


FIGURE 2

AGE COMPOSITION OF B.C. ADULTS, ANGLERS AND VISITING ANGLERS - 1988/89

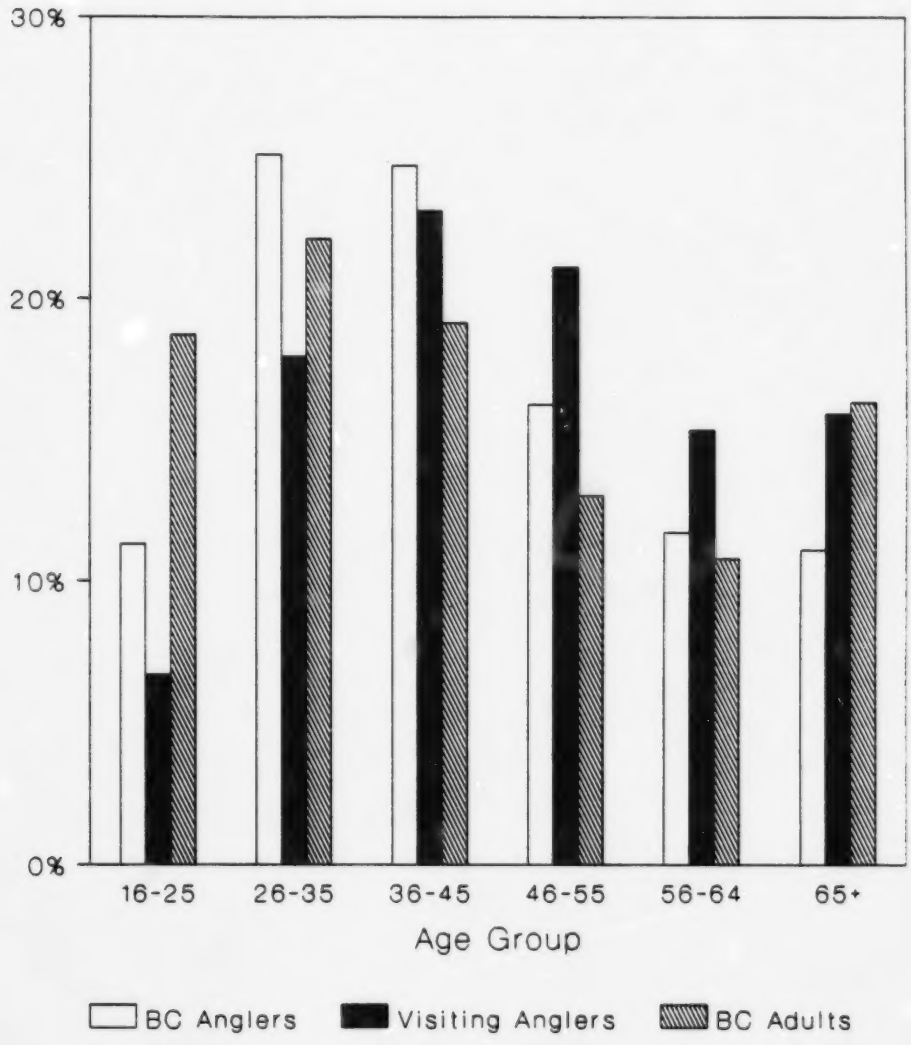
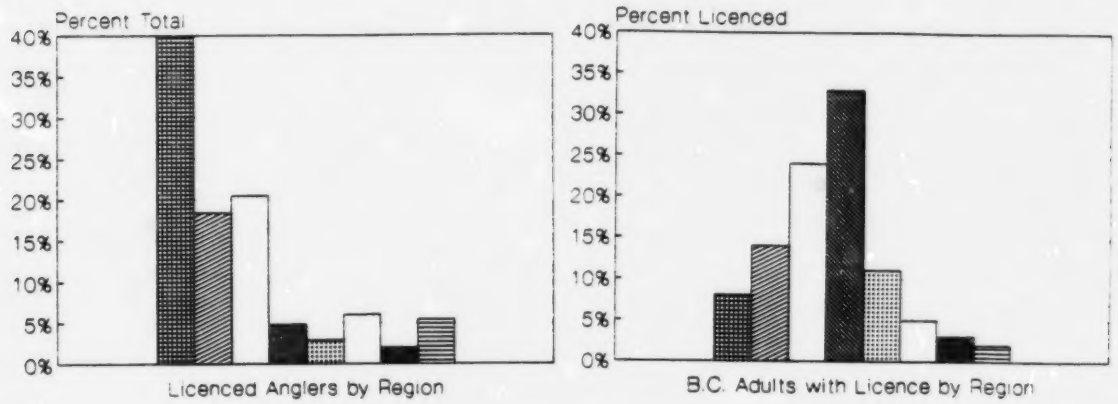


FIGURE 3

DISTRIBUTION OF B.C. RESIDENTS AND LICENCED ANGLERS BY REGION - 1988/89



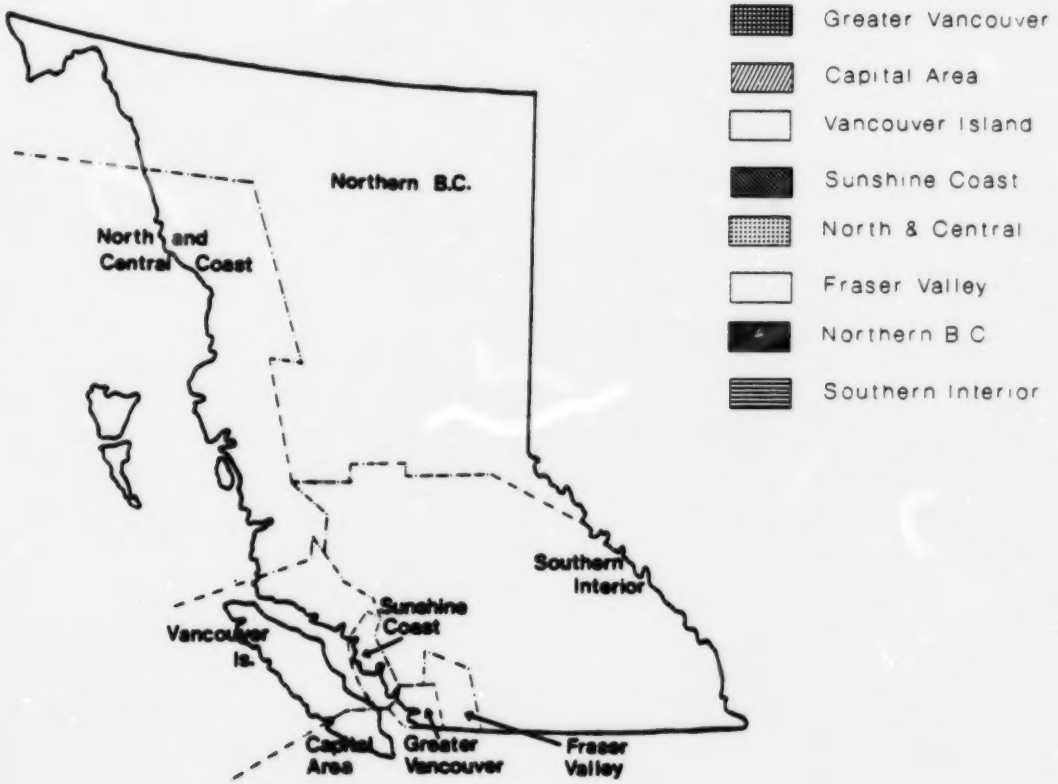
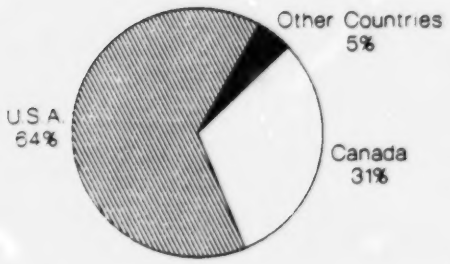


FIGURE 4

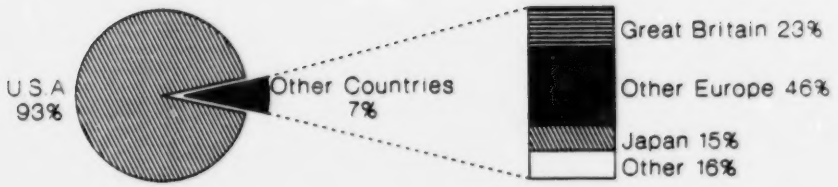
COMPOSITION OF VISITING ANGLER POPULATION - 1988/89

All Visiting Anglers
1988/89



Total Visiting Anglers

NonCanadian Anglers
1988/89



Total NonCanadian Anglers

Other Countries

Catch

British Columbia resident and visiting angler catches are presented in Table 5 and Table 6, respectively. The combined catch by B.C. resident and visiting anglers is presented in Table 7.

Most of the salmon were caught between Vancouver Island and the mainland. This area accounted for 89% of the total salmon, including 66% of the chinook and 96% of the coho caught and kept by B.C. resident anglers in 1988/89. This area contributed a smaller proportion (75%) of the total salmon caught by visiting anglers.

Over 70% of the rockfish and lingcod caught by residents were taken from waters between Vancouver Island and the mainland. About 60% of the lingcod and the rockfish caught by visitors were taken from this area. Forty percent of the halibut caught by B.C. residents were taken from waters north of Vancouver Island. Sixty percent of the halibut catch by visitors was taken from waters west of Vancouver Island.

TABLE 5

1988/89 CATCH[1] AND EFFORT BY REGION FOR B.C. RESIDENT ANGLERS

Region	Days Fished	Chinook	Coho	Pink Salmon	Other Salmon	Total Salmon	Lingcod	Rockfish	Halibut
North Coast (Areas 1- 6)[2]	31.0	5.5	5.7	4.8	0.4	16.4	10.3	28.7	5.7
Central Coast (Areas 7-11)[2]	6.7	0.7	6.1	1.1	0.0	7.9	0.7	3.1	1.0
E. Vancouver Is. (Areas 12-14)[2]	372.7	33.7	487.5	38.5	2.3	562.0	31.7	73.2	3.2
Sunshine Coast (Areas 15-16)[2]	145.4	14.4	139.5	2.5	0.5	156.9	17.2	53.6	0.2
S. Vancouver Is. (Areas 17-20)[2]	352.3	48.7	262.1	3.4	13.4	327.6	34.4	131.6	2.9
W. Vancouver Is. (Areas 21-27)[2]	127.2	49.6	32.2	4.5	31.3	117.6	25.3	48.7	1.4
Lower Mainland (Areas 28-29)[2]	185.0	9.2	92.3	1.0	17.6	120.1	6.2	23.8	0.0
Total B.C.[3] (Areas 1-29)[2]	1220.3	161.8	1025.4	55.8	65.56	1308.5	125.8	361.1	14.4

[1] Catch is reported as thousands of fish kept.
[2] Department of Fisheries statistical areas as indicated on the map in Appendix B.
[3] Totals may not equal the sum of the regions due to rounding.

TABLE 6

1988/89 CATCH[1] AND EFFORT BY REGION FOR VISITING ANGLERS

Region	Days Fished	Chinook	Coho	Pink Salmon	Other Salmon	Total Salmon	Lingcod	Rockfish	Halibut
North Coast (Areas 1- 6)[2]	29.0	10.9	9.7	3.7	1.5	25.8	4.9	12.7	3.0
Central Coast (Areas 7-11)[2]	27.9	6.9	14.2	11.1	0.2	32.4	3.8	5.6	2.1
E. Vancouver Is. (Areas 12-14)[2]	259.1	46.5	243.2	39.2	3.6	332.5	34.9	79.5	2.2
Sunshine Coast (Areas 15-16)[2]	29.8	4.1	18.8	0.1	0.2	23.2	3.9	15.0	0.1
S. Vancouver Is. (Areas 17-20)[2]	54.0	10.3	19.0	1.7	0.2	31.2	6.4	19.2	0.4
W. Vancouver Is. (Areas 21-27)[2]	84.6	36.7	33.3	2.6	2.3	74.9	21.2	60.5	11.4
Lower Mainland (Areas 28-29)[2]	10.3	2.0	3.8	0.0	0.3	6.1	2.5	2.0	0.2
Total B.C.[3] (Areas 1-29)[2]	494.7	117.4	342.0	58.4	8.3	526.1	77.6	194.5	19.4

[1] Catch is reported as thousands of fish kept.

[2] Department of Fisheries statistical areas as indicated on the map in Appendix B.

[3] Totals may not equal the sum of the regions due to rounding.

TABLE 7

1988/89 B.C. TIDAL WATER SPORT CATCH[1] AND EFFORT (000'S)

	B.C. Resident Anglers[2]	Visiting Anglers[3]	Total[4]
Angler Days	1220.3	494.7	1715.1
Chinook	161.8	117.4	279.4
Coho	1025.4	342.0	1367.3
Pink Salmon	55.8	58.4	114.2
Other Salmon	65.5	8.3	73.7
Total Salmon	1308.5	526.1	1834.6
Lingcod	125.8	77.6	203.5
Rockfish	361.1	194.5	555.6
Halibut	14.4	19.4	33.7

[1] Catch is reported as thousands of fish kept.
[2] Tidal Sportfishing Diary Program
[3] Visitors Sportfishing Survey
[4] Totals may not equal the sum of the regions due to rounding.

Effort

British Columbia resident anglers fished an estimated 1.2 million days in 1988/89. Visiting anglers fished an estimated 495,000 days in B.C. tidal waters in the 1988/89 licence year, bringing the total tidal water estimate of effort to 1.72 million days during the 1988/89 licence year. More than 90% of the finfish effort by B.C. resident anglers occurrs from boats. Most of the combined effort (82%) by residents and visitors occurs between Vancouver Island and the mainland.

Catch and Effort by Juvenile Anglers

A Tidal Waters Sport Fishing Licence for juvenile anglers, age 15 and under) was introduced as part of the 1988/89 licence system. The population of juvenile anglers by residence can be estimated from juvenile licence sales and a sample of licences providing residence information. In 1988/89, there were 44,900 B.C. juvenile anglers and 9,500 visiting juvenile anglers, estimated using licence sales and sample information.

Other surveys (Cox 1977; Cumming 1979; Pelletier, Lacasse and Ducharme 1981; Thomson 1974) indicate that the average number of days fished by resident juvenile anglers is one-third to two-thirds the average number of days fished by their adult counterparts. Juvenile resident effort is estimated using the assumption that each juvenile resident angler fishes half as many days as an adult resident.

Results of previous Visitors Surveys (James 1986, James 1985) indicate that the majority of visiting anglers come to the province to fish or for a vacation. Juvenile visiting anglers would probably be members of families on fishing trips or vacations. These juveniles would be more likely to fish than would resident juveniles. The assumption is, therefore, that visiting juveniles fish proportionally more than resident juveniles but less than visiting adults. It is assumed that visiting juveniles fish 75% the number of days fished by visiting adults.

The catch by juvenile anglers is estimated to be the effort by juvenile anglers multiplied by the catch rates for adult anglers. It is assumed that juvenile anglers generally fish with and are assisted by adults so the catch rates are equal. The catch and effort for juvenile anglers is presented in Table 9. These numbers are not included in the previously discussed catches by adult anglers.

TABLE 8

B.C. TIDAL WATER SALMON SPORT CATCH[1] AND EFFORT (000'S)
1985 - 1988

	1985/86	1986/87	1987/88	1988/89
Effort				
Angler Days	2,260.4	2,107.0	1,950.1	1715.1
Catch				
Chinook	549.5	516.2	392.4	279.4
Coho	1,117.2	1,302.3	1,156.9	1,367.3
Other Salmon	296.3	112.3	394.9	187.9
Total Salmon	1,963.0	1,930.8	1,944.1	1,834.6
Catch per Unit Effort				
Chinook	0.24	0.24	0.20	.16
Coho	0.49	0.62	0.59	.80
Total Salmon	0.87	0.92	1.00	1.07

[1] Catch is reported as thousands of fish kept.

TABLE 9

1988/89 SPORT CATCH AND EFFORT BY ADULT AND JUVENILE ANGLERS

Type of Angler	Number of Anglers	Angler Days	Chinook	Coho
Adults:				
B.C. Residents	237,000	1,220,300	161,800	1,025,400
Visitors	108,500	494,700	117,400	342,000
Total Adults[1]	345,500	1,715,100	279,400	1,367,300
Juveniles:				
B.C. Residents	44,900	115,600	15,000	97,100
Visitors	9,500	32,300	7,800	22,300
Total Juveniles	54,400	147,900	22,800	119,400
TOTAL ANGLERS	399,900	1,873,700	309,300	1,547,900

[1] Totals may not equal the sum of the columns due to rounding.

DISCUSSION

Nonresponse Bias

Certain types of error are associated with any type of survey. One type of error is referred to as nonresponse and results from the failure to measure or contact the entire survey sample (Cochrane 1977). Biased measurements could be obtained if the characteristics of the measured group differ from the group that was not measured. Individuals that voluntarily return questionnaires as part of a mail survey are possibly more interested in the questionnaire subject and could differ from those who don't return questionnaires. Tidal Diary respondents could be more active and successful anglers than nonrespondents. Estimates of fishing activity from this source alone could be biased upwards.

Nonrespondents were surveyed by telephone as part of the 1987/88 Diary program. Survey results indicate that 73% of the nonrespondents fished compared to 74% of the respondents. A chi-square test indicated no difference between these participation rates at the .05 level of significance. Nonrespondents reported fishing more days and catching more salmon, on the average, although these differences are not significant as indicated by t-tests at the .05 level of significance. Catch per angler day (CPUE) can be considered to be a measure of fishing success. The chinook and coho CPUE for respondents were higher but not significantly so as indicated by t-tests at the .05 level of significance. Therefore, the hypothesis that nonrespondents were as successful as the respondents was accepted.

Recall Bias

Another source of error is recall bias that arises when individuals cannot always accurately recall details after time has passed. The result could be either under or over estimating, depending on the subject. The magnitude of the error could increase with time. This type of bias can be a problem in postseason mail surveys such as the Visitors Survey when the recall period is long. Diary program participants, however, are asked to recall the last half month only and keep records as they fish for the remainder of the month. For each half month, a recalled set of data and a current set of data are collected. Generally, the average catch and effort was higher for recalled data than for current data with the exception of other salmon, lingcod and halibut. The differences between the recalled and current data

are not significant as indicated by analyses of variance at the .05 level of significance.

Diaries received more that one month after the last date of the diary "month" are considered to be late and are not used for catch and effort estimation. The purpose of this exclusion is to eliminate information recalled over a longer period of time and reduce the possible effects of recall bias.

Inaccurate Reporting

Error can also result from inaccurate reporting by the respondents. Drawings of the required fish with identification points were supplied to all of the diarists to assist in correct species identification. During data entry, a computer program checked the catches against valid daily limits. Catches over the limit were were not used for catch estimation because the the catch could have been identified incorrectly or the reported catch could have been for the fishing party rather than for the individual angler.

REFERENCES

Cochran, W.G. 1977. Sampling techniques. Wiley and Sons, Toronto. 428p.

Cox, K.W. 1977. Sportfishing in Newfoundland - a survey of anglers. Dep. Fish. Environ., Fish. Mar. Serv., Ottawa. 61p.

Cumming, K.J. 1979. Sportfishing in Nova Scotia - a survey of anglers. Dep. Fish. Oceans, Ottawa. 63p.

Department of Fisheries and Oceans. 1988. British Columbia Tidal Waters Sport Fishing Guide. 28p.

James, M.D. 1985. The Visitors Sportfishing Survey - 1983/84. Can. MS Rep. Fish. Aquat. Sci. 1831: v + 34 p.

_____. 1986. The Visitors Sportfishing Survey - 1985. Can. MS Rep. Fish. Aquat. Sci. 1911: v + 32 p.

Ministry of Finance and Corporate Relations. 1989. 1989 Municipal and regional district populations estimates. Oct, 1989. Central Statistics Bureau, Province of British Columbia.

Pelletier, J., M. Lacasse and J. Ducharme. 1981. Recreational use of fish and wildlife resources in Quebec - a population survey (highlights). Direction de la planification. Ministère du Loisir, de la Chasse et de la Pêche.

Statistics Canada. 1988. Postcensal Annual Estimates of Population, and Components of Growth by Sex and Age for Canada, Provinces and Territories, June 1, 1988. Publication 91-210.

Thomson, I.D. 1974. Prince Edward Island school survey of anglers. Recreational Fisheries Branch. Fisheries and Marine Service, Environment Canada. 32p.

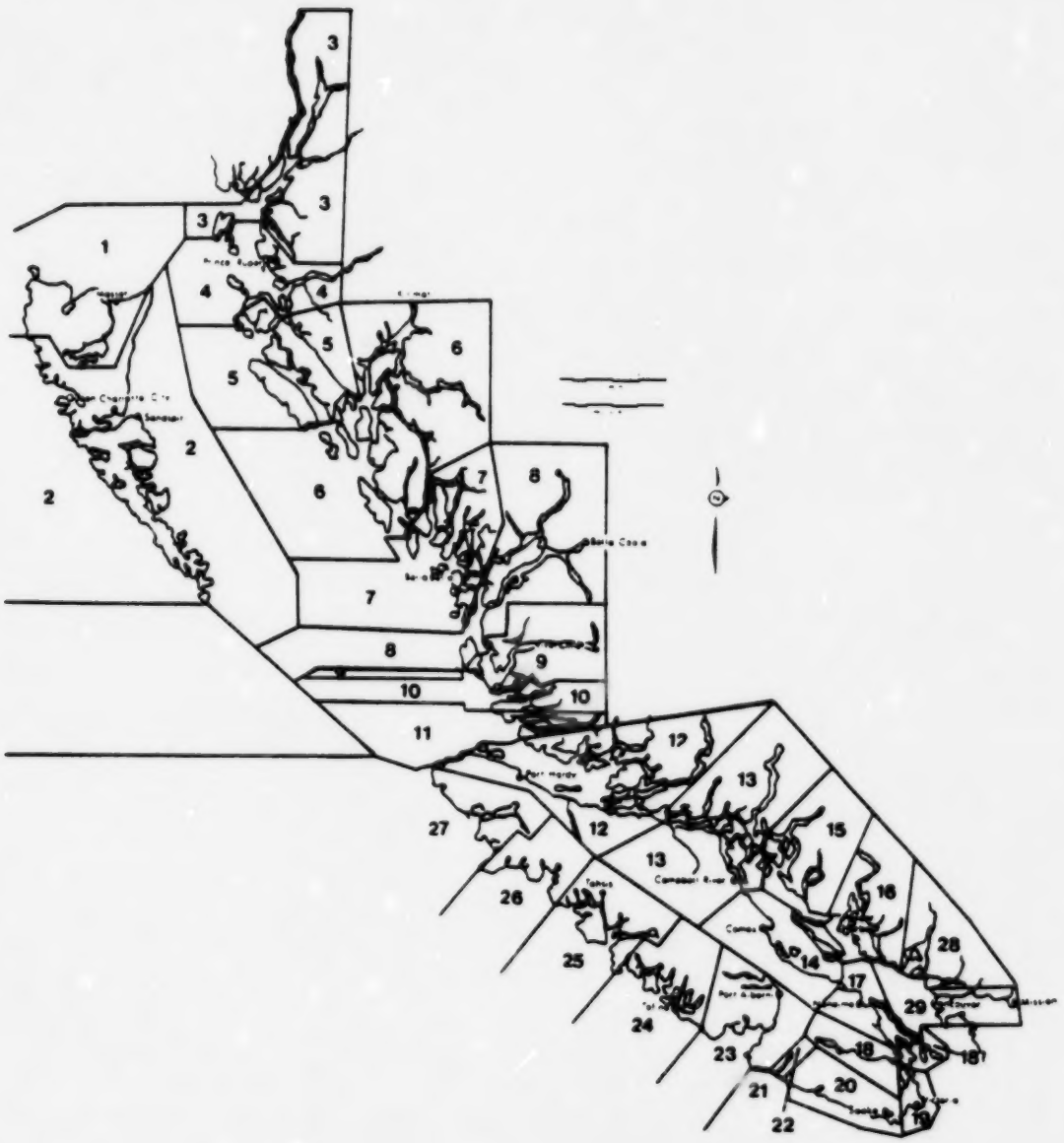
APPENDIX A

SPECIES LIST
COMMON AND SCIENTIFIC NAMES OF FISH RECORDED

Common Name	Scientific Name
Chinook	*Oncorhynchus tshawytscha*
Coho	*Oncorhynchus kisutch*
Pink Salmon	*Oncorhynchus gorbuscha*
Other salmon	*Oncorhynchus spp.*
Lingcod	*Ophiodon elongatus*
Rockfish	*Sebastes spp.*
Halibut	*Hippoglossus stenolepis*

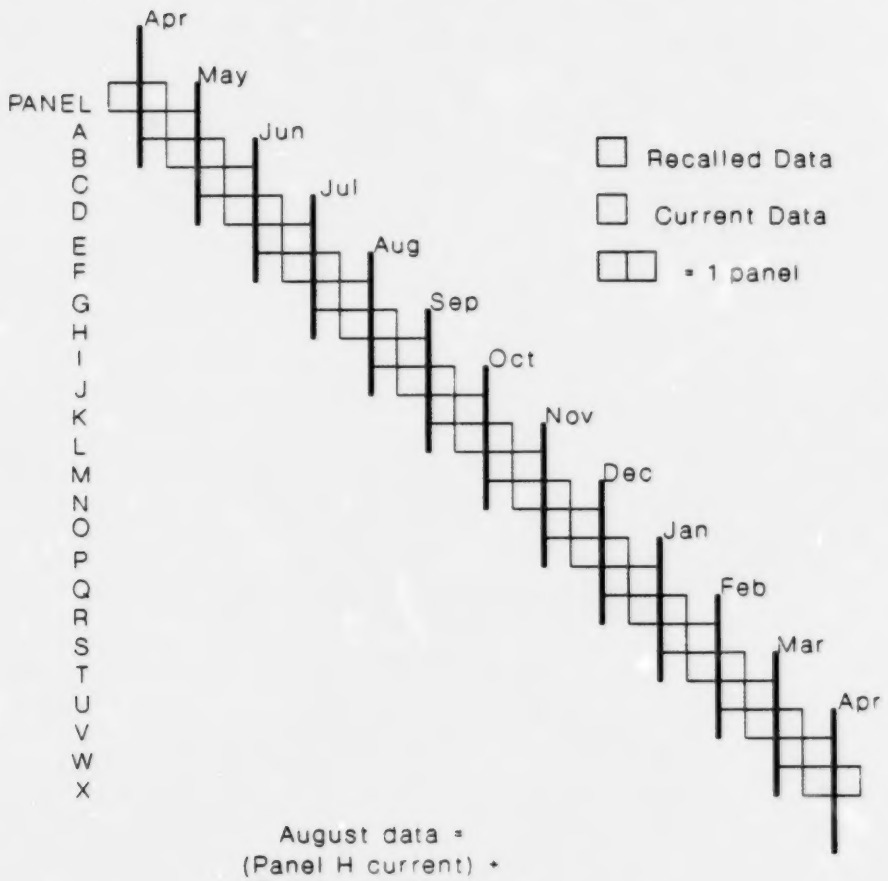
APPENDIX B

STATISTICAL AREA MAP



APPENDIX C

TIDAL SPORTFISHING DIARY PROGRAM - PANEL PRESENTATION



August data =
(Panel H current) +
(Panel I recalled) +
(Panel I current) +
(Panel J recalled)

APPENDIX D

FORM SAMPLES

1. Tidal Sportfishing Diary - Page 1

TIDAL SPORTFISHING DIARY (O)

Please record the fishing information even if you caught no fish.

Date	Area (See map)	Fishing From: Boat, Shore, Pier, Bar or Diving	Chinook			Coho			Other Salmon		Other Fish			Sites
			rel.	kept	# marked	rel.	kept	# marked	Pink kept	Other Salmon kept	Lingcod kept	Rockfish kept	Halibut kept	Y/N
Tues Nov 1														
Wed 2														
Thur 3														
Fri 4														
Sat 5														
Sun 6														
Mon 7														
Tues 8														
Wed 9														
Thur 10														
Fri 11														
Sat 12														
Sun 13														
Mon 14														
Tues 15														
Wed 16														
Thur 17														
Fri 18														
Sat 19														
Sun 20														
Mon 21														
Tues 22														
Wed 23														
Thur 24														
Fri 25														
Sat 26														
Sun 27														
Mon 28														
Tues 29														
Wed 30														

☐ Did not fish during this period.

1. Tidal Sportfishing Diary - Page 2

Instructions

Please record the following information in the appropriate column for each day fished in B.C. tidal waters during the dates covered by this diary form:

1. Statistical area: Refer to the map below and record the number that corresponds to your location.

2. Fishing from: Boat, shore, pier, river bar or diving only.

3. Chinook: Record the number of chinook caught and released in the column "rel.". Record the number of chinook caught and kept in the "kept" column. This should be the number of chinook recorded on your licence for that day and tagged with a Chinook Conservation tag. Record the number of marked (Fin-clipped or wire tagged by Fisheries) chinook in the "marked" column. The number of marked chinook should be included in the number of chinook released and kept. Only include fish caught by you personally.

4. Coho: Record the number of coho caught and released in the column "rel.". Record the number of coho caught and kept in the "kept" column. Record the number of marked (Fin-clipped or wire tagged by Fisheries) coho in the "marked" column. The number of marked coho should be included in the number of coho released and kept. Only include fish caught by you personally.

5. Pink salmon: The number of pink salmon caught by you personally and kept.

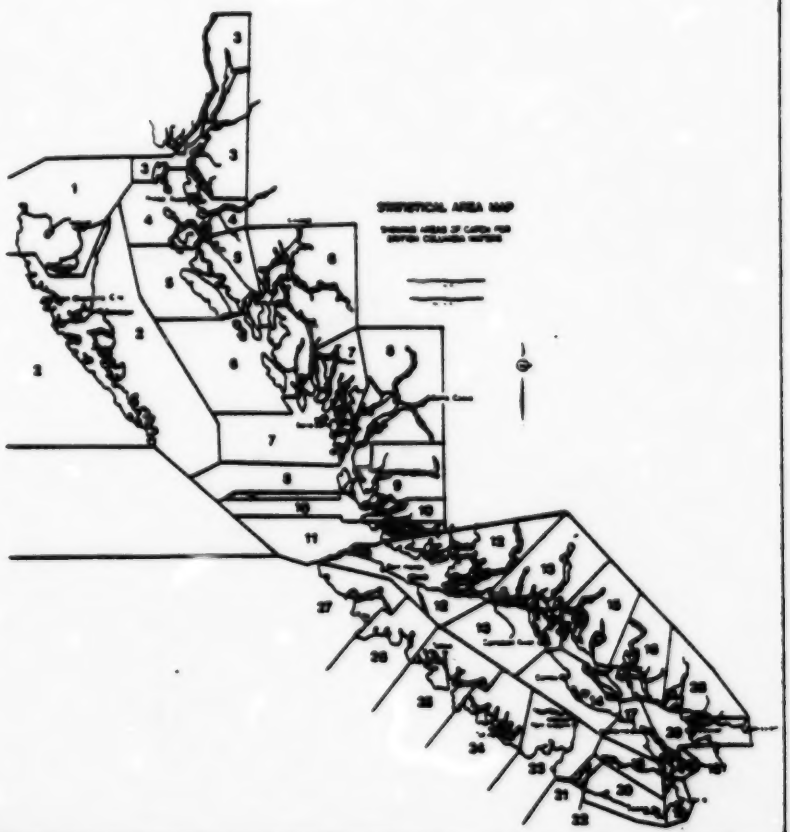
6. Other salmon: The number of chum and sockeye caught by you personally and kept.

7. Other fish: The number of lingcod, rockfish and halibut caught by you personally and kept.

8. Sites: This column is to be used by anglers fishing from a boat only. Record "Y" if you landed your boat at one of the sites on the enclosed list of sites for this month. Otherwise, record "N".

Please record the fishing information even if you caught no fish.

Please mail the form at the end of the diary period using the business reply envelope supplied. If you did not fish during the diary period, please check the box at the bottom of the form and return the diary by mail. Please do not mail this form on to a 'buster' angler.



2. Visitor Sportfishing Survey - Page 1

VISITORS SPORTFISHING SURVEY

How many visits to British Columbia did you make during the 1988/89 licence year (April 1988 - March 1989) which included fishing in B.C tidal waters?

_____ visit's.

Please fill in the following table, even if you did not catch any fish. Instructions for filling out the table are given below.

MONTH	AREA	DAYS FISHED	SALMON				OTHER FISH		
			CHINOOK	COHO	PINK	OTHER	LINGCOD	ROCKFISH	HALIBUT

MONTH: Record the month(s) you personally fished in B.C. tidal waters in the 1988/89 licence year.

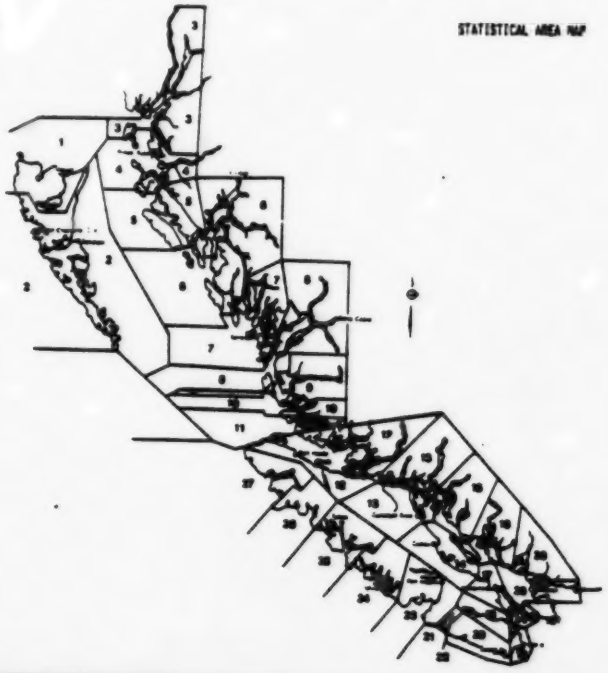
AREA: Refer to the map of Fisheries statistical area (below). Locate the area where you were fishing and record the corresponding area number. If you fished in more than one area in the month, use a separate line for each area fished and record the appropriate information for those areas on separate lines.

DAYS FISHED: Record the days you personally fished in each area in each month, including the days where nothing was caught.

CATCH: In the appropriate column, record the total number of fish caught by you personally. Do not include released fish. Please record king and spring salmon in the "chinook" column and silver salmon in the "coho" column.

FRANCAIS AU VERSO

STATISTICAL AREA MAP



2. Visitor Sportfishing Survey - Page 2

ENQUETE SUR LA PECHE SPORTIVE PRATIQUEE PAR LES VISITEURS

Combien de fois avez-vous visité la Colombie-Britannique pendant la période de validité de votre permis de pêche sportive dans les eaux à marée 1988-1989 (d'avril 1988 à mars 1989).

_____visite(s)

Veuillez remplir le tableau ci-après, même si vous n'avez attrapé aucun poisson. Des instructions sont fournies ci-dessous.

MOIS	ZONE	JOUR/ PECHE	SAUMONS			AUTRES POISSONS		
			QUINNAT	CHINOOK	AUTRES	MORUE-LINGUE	SEBASTE	FLETAN

MOIS: Indiquez le(s) mois où vous avez personnellement pêché dans les eaux à marée de la C.-B. pendant la période de validité du permis 1988-1989.

ZONE: Reportez-vous à la carte des zones statistiques des pêches (ci-dessous), trouvez la zone où vous avez pêché et inscrivez le numéro correspondant. Si vous avez pêché dans plus d'un zone au cours d'un même mois, remplir une ligne pour chaque zone et indiquez à chaque fois les renseignements correspondant au zone.

JOURS DE PECHE: Indiquez les jours où vous avez personnellement pêché dans chaque zone pour chaque mois, y compris les jours où vous n'avez rien attrapé.

PRISES: Dans la colonne appropriée, inscrivez le nombre total de poisson(s) que vous avez personnellement capturé(s). N'incluez pas le(s) poisson(s) que vous avez rejeté(s).

ENGLISH ON REVERSE

LA CARTE DES ZONES STATISTIQUES